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09/987,364	11/14/2001	Johann Engelhardt	2203/50472	6798

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EXAMINER	
GEISEL, KARA E	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/987,364	ENGELHARDT, JOHANN	
	Examiner	Art Unit	
	Kara E Geisel	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 6-20* is/are rejected.

7)☒ Claim(s) *4 and 5* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1101*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed on November 14th, 2001 has been considered by the examiner.

Drawings

The drawings are objected to because of the following:

In order to make the drawings more readily readable, the parts of the apparatus shown, in Fig. 4 in block diagram form require appropriate descriptive legends. See 37 CFR § 1.84(o).

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the further pulsed laser disclosed in claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 1 is objected to because of the following informalities: minor typographical error.

In regards to claim 1, line 2, comprises is spelled incorrectly.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 8-13, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Pope et al. (USPN 5,308,971).

In regards to claim 1, Pope discloses a method for measuring the lifetime of an excited state in a specimen (column 7, 40-42), comprising generating an exciting light pulse and an emitting light pulse (column 3, lines 50-61), illuminating the specimen with the exciting light pulse (column 4, lines 32-38), illuminating the specimen with the emitting light pulse at a predefined time offset from illuminating the specimen with the exciting light pulse (column 4, lines 38-47), detecting the power level of the luminescent light emerging from the specimen, repeating the first four steps with different time offsets (column 7, lines 63-65), and determining the lifetime of the excited state of the specimen as a function of the power level of the luminescent light emerging from the specimen and the time offset (column 4, lines 48-52).

In regards to claim 3, the exciting light pulse and the emitting light pulse are generated by a single pulsed laser (fig. 1, 11).

In regards to claim 8, light of the wavelength of the emitting light pulse is not detected.

In regards to claim 9, Pope discloses an apparatus for measuring the lifetime of an excited state in a specimen (fig. 1, 10), wherein the apparatus comprises an electromagnetic energy source (11) that emits light of one wavelength (column 3, lines 44-50), a means for dividing the light into at least a first and a second partial light beam (13) and an intermediate element in at least one partial light beam to influence the time of travel of the at least one partial light beam (20-21).

In regards to claim 10, the first partial light beam is an exciting light beam directed onto a specimen (30), and excites a defined subregion there (column 4, lines 33-38).

In regards to claim 11, the second partial light beam defines an emitting light beam and is directed onto the specimen in such a way that the subregion of the specimen is at least partially overlapping (column 4, lines 38-47).

In regards to claim 12, the intermediate element modifies the length of the optical light path (column 3, lines 58-66).

In regards to claim 13, the intermediate element is configured movably and thereby defines a chicane having an adjustable passage length (column 3, lines 58-66).

In regards to claim 16, the excitation can be multi-photon excitation (columns 5-6, lines 62-68 and 1-2, respectively).

In regards to claim 17, the electromagnetic energy is a pulsed laser (column 3, lines 44-50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 6-13, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Müller (USPN 5,978,083).

In regards to claim 1, Müller discloses a method for measuring properties an excited state in a specimen (column 7, 62-65), comprising generating an exciting light pulse and an emitting light pulse (column 6, lines 38-42), illuminating the specimen with the exciting light pulse (column 6, lines 47-50), illuminating the specimen with the emitting light pulse at a predefined time offset from illuminating the specimen with the exciting light pulse (columns 7-8, lines 66-67 and 1-6), detecting the power level of the luminescent light emerging from the specimen, repeating the first four steps with different time offsets (column 8, lines 6-19), and determining the properties of the excited state of the specimen as a function of the power level of the luminescent light emerging from the specimen and the time offset (column 7, lines 62-65). It is not specifically disclosed that the properties measured is the lifetime of the excited state in a specimen, however, it is disclosed that the measurement of the properties can be made over a time period in order to produce time-resolved measurements (column 7, lines 62-65). It is very well known in the art that lifetime measurements are useful in determining the identity of a fluorophore that is being excited to fluoresce, especially if there are multiple fluorophores in a solution that can be excited by the same wavelength but have different lifetimes. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this method to make lifetime measurements, since it can be used to take measurements over time, in order to identity a fluorophore in a solution of multiple fluorophores that are excited by the same wavelength but have different lifetimes.

In regards to claim 3, the exciting light pulse and the emitting light pulse are generated by a single pulsed laser (fig. 1, 1).

In regards to claim 6, the luminescent light is fluorescent light (column 3, lines 39-47).

In regards to claim 7, the specimen is a microscopic sample equipped with fluorescent dyes (column 3, lines 39-47).

In regards to claim 8, the wavelength of the emitting light pulse does not have to be detected (column 8, lines 4-12).

In regards to claim 9, Müller discloses an apparatus for measuring the properties of an excited state in a specimen (fig. 1), wherein the apparatus comprises an electromagnetic energy source (1) that emits light of one wavelength, a means for dividing the light into at least a first and a second partial light beam (4) and an intermediate element in at least one partial light beam to influence the time of travel of the at least one partial light beam (5). It is not specifically disclosed that the properties measured is the lifetime of the excited state in a specimen, however, it is disclosed that the measurement of the properties can be made over a time period in order to produce time-resolved measurements (column 7, lines 62-65). It is very well known in the art that lifetime measurements are useful in determining the identity of a fluorophore that is being excited to fluoresce, especially if there are multiple fluorophores in a solution that can be excited by the same wavelength but have different lifetimes. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this method to make lifetime measurements, since it can be used to take measurements over time, in order to identity a fluorophore in a solution of multiple fluorophores that are excited by the same wavelength but have different lifetimes.

In regards to claims 10-11, the first partial light beam is an exciting light beam directed onto a specimen, and excites a defined subregion there and the second partial light beam defines an emitting light beam and is directed onto the specimen in such a way that the subregion of the specimen is at least partially overlapped (columns 7-8, lines 45-67 and 1-19, respectively).

In regards to claim 12, the intermediate element modifies the length of the optical light path (column 6, lines 42-47).

In regards to claim 13, the intermediate element is configured movably and thereby defines a chicane having an adjustable passage length (column 6, lines 42-47).

In regards to claim 16, the excitation can be multi-photon excitation (column 7, lines 59-62).

In regards to claim 17, the electromagnetic energy can be a pulsed laser (column 3, lines 21-23).

In regards to claim 19, Müller discloses a scanning microscope comprising a device for generating a relative motion between an illuminating light beam and a specimen (column 9, lines 22-24), a microscope optical system (fig. 1), a detector (11), and an apparatus for measuring the properties of an excited state in a specimen (10). It is not specifically disclosed that the properties measured is the lifetime of the excited state in a specimen, however, it is disclosed that the measurement of the properties can be made over a time period in order to produce time-resolved measurements (column 7, lines 62-65). It is very well known in the art that lifetime measurements are useful in determining the identity of a fluorophore that is being excited to fluoresce, especially if there are multiple fluorophores in a solution that can be excited by the same wavelength but have different lifetimes. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this method to make lifetime measurements, since it can be used to take measurements over time, in order to identity a fluorophore in a solution of multiple fluorophores that are excited by the same wavelength but have different lifetimes.

In regards to claim 18, electromagnetic energy can be a pulsed laser (column 3, lines 21-23).

In regards to claim 20, the apparatus for measuring the lifetimes of an excited state in a specimen has an electromagnetic energy source that emits light of one wavelength (1), a means for dividing the light into at least a first and a second partial light beam (4), and an intermediate element in at least on partial light beam to influence the time of travel of the at least one partial light beam (5).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pope et al. (USPN 5,308,971).

In regards to claim 2, the exciting and emitting light pulses are both generated with a pulsed laser. It is not disclosed that they are generated by two different lasers synchronized with each other. However,

it is disclosed that this apparatus is used so that the generated exciting and emitting wavelengths are the same (column 4, lines 1-2), but that it would be possible to configure the apparatus in order to have the exciting and emitting wavelengths be different (column 4, lines 2-4). This would be done to allow different multi-photon excitations to occur, allowing more flexibility in the types of fluorescent substances used. It would be obvious to one of ordinary skill in the art at the time the invention was made to use two different lasers in place of the single laser of Pope's apparatus, each having different wavelengths, wherein the first pulsed laser would produce the exciting light, and the second pulsed laser would produce the emitting light, in order to have two different wavelengths as disclosed by the reference, and in order to allow for more flexibility in the types of fluorescent substances used.

Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pope et al. (USPN 5,308,971) in view of Baer (USPN 5,866,911).

In regards to claims 14-15, Pope does not disclose that an element for wavelength modification, such as an element for frequency multiplication, is provided in one partial light beam. However, it is disclosed that this apparatus is used so that the generated exciting and emitting wavelengths are the same (column 4, lines 1-2), but that it would be possible to configure the apparatus in order to have the exciting and emitting wavelengths be different (column 4, lines 2-4). This would be done to allow different multi-photon excitations to occur, allowing more flexibility in the types of fluorescent substances used.

Baer generally teaches placing an element for frequency multiplication in the path of a light beam in order to change the wavelength of that light beam (column 11, lines 52-54). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the element for frequency multiplication of Baer's apparatus into the path of one of the partial light beams of Pope's apparatus, so that the wavelength of that light beam can be changed, in order to allow more flexibility in the types of fluorescent substances used.

Allowable Subject Matter

Claims 4-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 4, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method for measuring the lifetime of an excited state in a specimen comprising reducing the energy of an emitting light pulse in proportion to the energy and an exciting light pulse, in combination with the rest of the limitations of claim 4.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Teich et al. (USPN 5,796,477), and Harter et al. (USPN 6,020,591)..

Teich generally discloses splitting a light beam from a laser source into two beams in order to produce multi-photon excitation in a sample, by delaying one of the beams by a specified time.

Harter discloses a method for measuring the properties of an excited state in a specimen, comprising generating an exciting light pulse and an emitting light pulse, illuminating the specimen with the exciting light pulse, illuminating the specimen with the emitting light pulse at a predefined time offset from illuminating the specimen with the exciting light pulse, detecting the power level of the luminescent light emerging from the specimen, and determining the properties of the excited state of the specimen as a function of the power level of the luminescent light emerging from the specimen and the time offset.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is **571 272 2416**. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on **571 272 2800 ext. 77**. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9306 for regular communications and 703 872 9306 for After Final communications.

F.L. Evans
Primary Examiner
Art Unit 2877

K.G.

KEG
September 24, 2004